

LEDGEAR® Specification

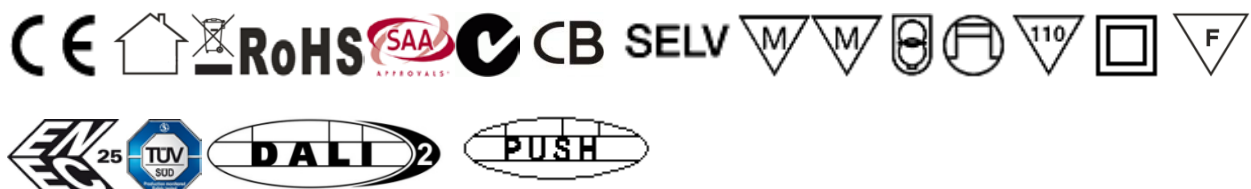
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GENERAL GUIDELINES

LEDGEAR® C6 series, a family of DALI-2 & Push-DIM independent ECG covering from 3.5W to 57W, design with through wiring and super large wiring space, saving a lot of time and effort on the actual wiring work on site. Big push-fit looping connectors are quick to connect cables with, supporting also various wire thicknesses. Wires are secured to the driver with click-on cable clamps, and strain relief cover clicks on effortlessly securing the connections without any need for screws.



The output current can be programmed by DALI or selected by DIP switches which allows you to adjust the constant output current to work with different power LED modules. It helps to reduce the inventory and faster to projects. These LED drivers provide Amplitude Modulation(AM, or CCR) current output, this LEDGEAR® C6 LED drivers is ideal for independent use with Class I, II and III luminaire, you can be sure to offer your customers high quality of light without visual flicker and stroboscopic effects to work in TV studios and security camera environments.



LED Electronic Looping Control Gear

DALI-2, Push-dim Constant Current Output

With 14-42VDC 250mA-1500mA Adjustable Output Series

Product description

- Design DALI-2, Push-DIM, output 2in1 dimming
- DALI member, compatible with universal DALI application controllers(also called masters, DALI USB)
- IEC 62386 Part 101,102(DALI-2), 207 qualified and tested in DALI house
- Reliable, Class II, SELV according EN 61347
- ENEC, CE, CB approved by TUV SUD, SAA, C-tick qualified
- $\pm 5\%$ output current accuracy(under maximum load)
- Permissible AC cable 0.75-2.5mm² wire gauge, 8~10mm PVC jacket diameter
- Protection for output open load, short circuits, over voltage and over temperature
- Built-in with permanent memory for DALI and Push-DIM, 100,000 times memory
- Operating temperature 1: -25°C ~ +50°C, the humidity: 20% ~ 85%
- Over 60,000 hrs nominal lifespan ¹
- Five-year factory guarantee and lifetime technical support ¹

“1” Detailed data please refer to the " PARAMETERS" table .

Features & Benefits

Flexibility & Optimized Inventory

- Both model covers wattages from 3.5W to 57W and differs in lifespan
- Wattage selectable by 4xDIP switches.
- Push-fit secondary terminals for LED module wires

Human Centric Design

- Easy & Quick connection with push-fit terminals and clip-on end cap for strain relief, super large wiring space
- Loop in & loop out function, max.2.5mm² cross section L, L, N, N, DA, DA,DA,DA stranded wire or solid wire
- Loose wiring inspection don't need to open the transparent end cap

Suitable for Emergency Lighting

- Suitable for Central Emergency System, CBS (central battery system)
- 50/60Hz and 0Hz(for emergency system)
- Suitable for emergency escape lighting systems according to EN 50172, LEDGEAR[®] can work with emergency DC voltage input, such as work with backup or emergency LED drivers(batteries).

Housing Properties

- Casing: polycarbonate, white
- Type of protection IP20

Typical applications

- For spot light and downlight in retail and hospitality applications
- For panel light and area light in office and education application

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PARAMETERS

MODEL		C628-42600DB-F	C650-421100DB-F	C665-421500DB-F
Output	Output voltage	14-42V	14-42V(Iout≤1000mA); 14-38V(Iout>1000mA);	14-40V(Iout≤1400mA); 14-38V(Iout>1400mA);
	Rated current	250 -600mA (preselected 250mA)	650 -1100mA (preselected 650mA)	1150 -1500mA (preselected 1150mA)
	Maximum power	25.2W	42W	57W
	Current tolerance	±5%	±5%	±5%
	Ripple voltage ²	200mVp-p	200mVp-p	150mVp-p
	Ripple current	150mAp-p	150mAp-p	100mAp-p
	Line regulation	±2%	±2%	±2%
	Load regulation	±3%	±3%	±3%
	Flicker percentage ³	<3%	<3%	<3%
	Output Pst_LM ⁵	<0.8	<0.8	<0.8
	Output SVM ⁵	<0.3	<0.3	<0.3
	Starting time	<500mS	<500mS	<500mS
	Turn off time	<2.0S	<2.0S	<2.0S
Noise ⁴	<22dB	<22dB	<22dB	
Input	Voltage	Rated:220-240V; Range:200-264V;		
	Frequency	Rated:50-60Hz, 0Hz; Range:47-63Hz, 0Hz;		
	Power factor	≥0.9; (Pout ≥ 15W)	≥0.9; (Pout ≥ 20W)	≥0.9; (Pout ≥ 20W)
	I-THD ⁵	<15%	<12%	<10%
	Efficiency ⁶	≥85%	≥87%	≥88%
	AC current	180mA max.	300mA max.	350mA max.
	Inrush current ⁷	25A	35A	35A
	Inrush current time	45uS	55uS	85uS
	Leakage current	<1mA	<1mA	<1mA
	ON/OFF switches cycle	>100,000	>100,000	>100,000
Standby power	<0.5W	<0.5W	<0.5W	
DALI & PUSH Control	Dimming control mode	Amplitude (AM) dimming		
	Dimming control type	DALI DT6(1 channels dimming) & Push dimming		
	DALI Input Voltage	Rated:16V; Range:9.5-22.5V;		
	DALI Input (Bus) Current	Rated:1.6mA; Range:1.5-1.7mA;		
	Dimming Range	DALI-2: 2%-100%; PUSH: 3%-100%; (AM dimming mode)		
DALI Standard	IEC 62386-101: 2014, IEC 62386-102: 2014, IEC 62386-207: 2009, IEC 62386-209: 2009			
Protection	Over current	Constant current limiting, recovers automatically after fault condition is removed		
	Over voltage	Shut down output voltage, with auto-recovery or re-power on to recovery		
	Over temperature	Shut down output voltage, recovers automatically after temperature goes down		
	Short circuit	Constant current limiting, recovers automatically after fault condition is removed		
Safety & EMC	Safety standards	EN61347-2-13; Design refer to TUV EN60950-1, TUV EN61347-1		
	Withstand voltage	I/P-O/P:3KVac I/P-FG:1.5KVac O/P-FG: 500Vdc		
	Isolation resistance	I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500Vdc/25°C/75%RH		
	EMC emission ⁸	EN55015B, EN55022 Class B, EN61000-3-2, EN61000-3-3		

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	EMC immunity	EN61000-4-2, EN61547, EN55024, EN-61000-4-5 Surge immunity Line-Earth: 2KV, L Line- N Line:1KV;			
Environment	Ambient temperature range ⁹	-25°C ~ +50°C	-25°C ~ +50°C:Pout<40W; -25°C ~ +45°C:Pout≥40W);	-25°C ~ +50°C:Pout<54W; -25°C ~ +45°C:Pout≥54W);	
	Max. case temperature(tc) ¹⁰	80°C	85°C	90°C	
	Relative humidity range	20% ~ 85%RH	20% ~ 85%RH	20% ~ 85%RH	
	Storage temperature range	-30°C ~ +75°C	-30°C ~ +75°C	-30°C ~ +75°C	
max. No. of PSUS(Driver supply unit) on miniature circuit breaker(MCB)	MCB TYPE B	10A	36pcs @ Pout Max.	21pcs @ Pout Max	18pcs @ Pout Max
		16A	57pcs @ Pout Max	34pcs @ Pout Max	30pcs @ Pout Max
		20A	72pcs @ Pout Max	43pcs @ Pout Max	37pcs @ Pout Max
	MCB TYPE C	10A	39pcs @ Pout Max	23pcs @ Pout Max	20pcs @ Pout Max
		16A	62pcs @ Pout Max	37pcs @ Pout Max	32pcs @ Pout Max
		20A	77pcs @ Pout Max	46pcs @ Pout Max	40pcs @ Pout Max
	MCB TYPE D	10A	44pcs @ Pout Max	26pcs @ Pout Max	23pcs @ Pout Max
		16A	71pcs @ Pout Max	42pcs @ Pout Max	36pcs @ Pout Max
		20A	89pcs @ Pout Max	53pcs @ Pout Max	45pcs @ Pout Max
	Lifetime(hrs)@ tc=70°C	>60,000H	>60,000H	>60,000H	
MTBF [MIL-HDBK-217F (ta=25 °C)]	475K Hrs min	498K Hrs min	527.6K Hrs min		
Glow wire test	850°C for 5S; 650°C for 30S				
Dimension L x W x H	130.5 x 73 x 29.8mm				
Warranty years	5 years				

“2” Ripple voltage is measured at 20MHz of bandwidth by using a 12” twisted pair-wire terminated with a 100nF & 47uF parallel capacitor.

“3” The flicker for frequencies of 200 Hz or below, input voltage 230Vac , at 100% output current level and 20% output current level with dimmer attached, output current ripple is defined as $[(I_{max} - I_{min}) / (I_{max} + I_{min})] * 100\%$, (CEC-400-2016-018-FS, Title 24 part 6 JA8).

“4” The noise of LED driver is defined as test data when driver tested in noise room with 50~60dB environment, and been hang in 1ft (305mm) inside chamber.

“5” Rated voltage input, rated output current, maximum output current.

“6” The typical efficiency is test data of output current at input @230Vac with 36V output voltage, maximum output current.

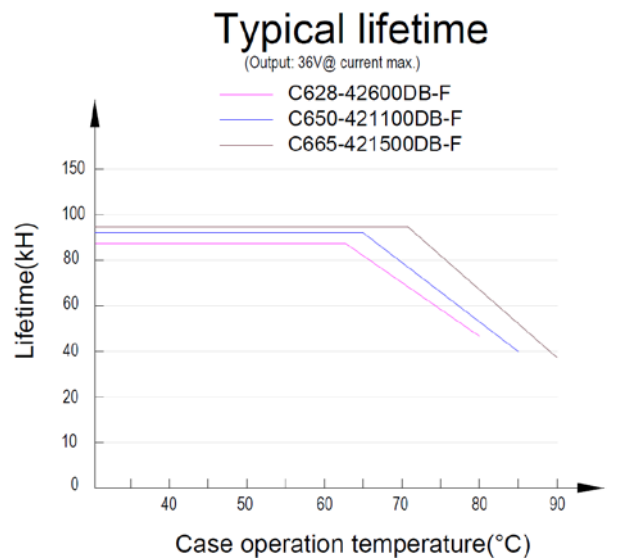
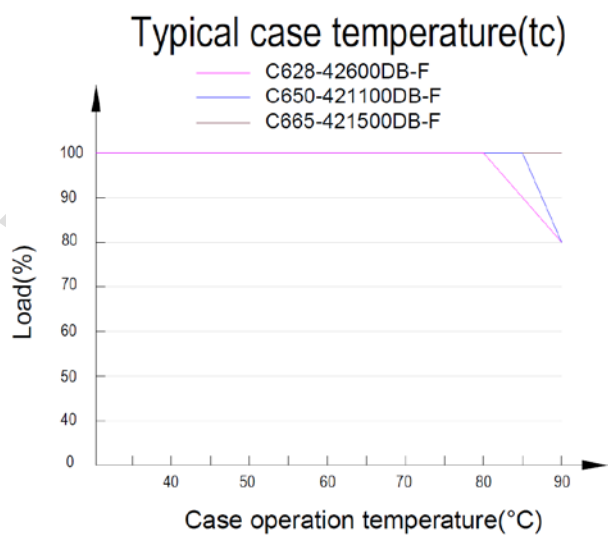
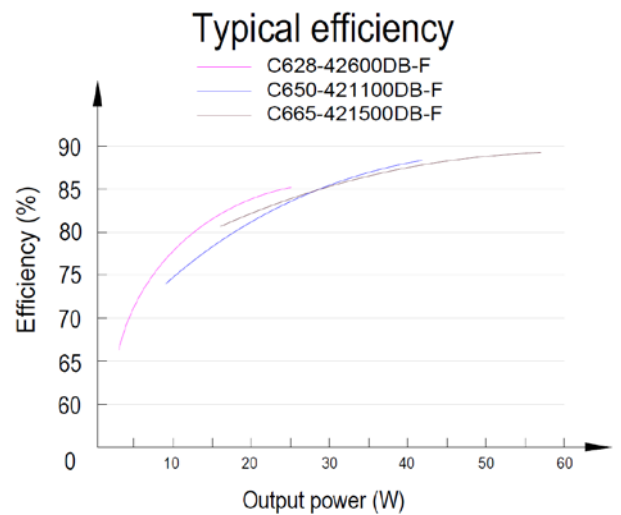
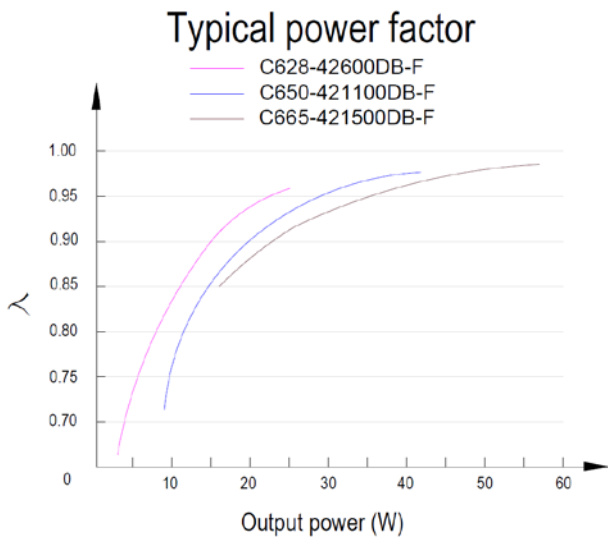
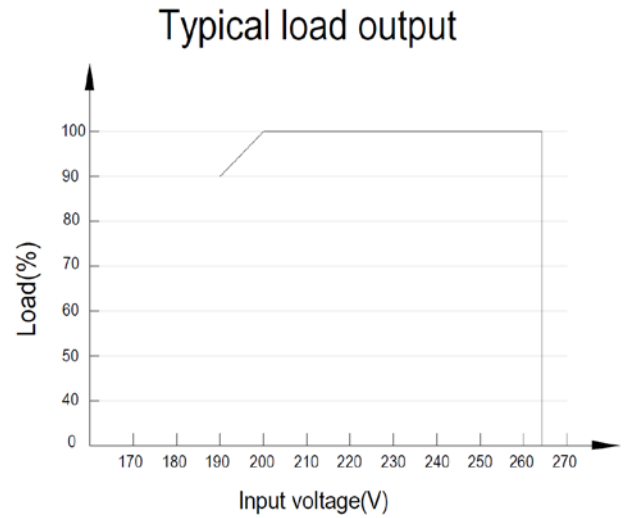
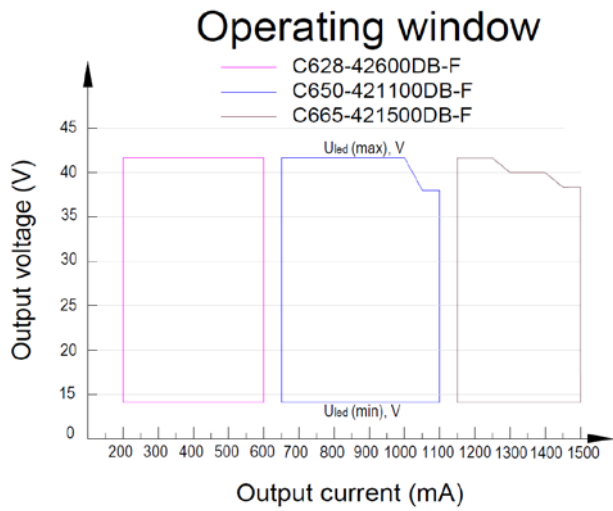
“7” The inrush current is test data of 230Vac input, cold start, measured at input current peak.

“8” The driver is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC directive on the complete installation again.

“9” For other than independent use, higher ta of the control gear possible as long as highest allowed tc point temperature is not exceeded.

“10” The tc is defined as the highest permissible temperature which may occur on the outer surface of the power under normal operating conditions and at the rated voltage/current/power or the maximum of the rated voltage/current/power range, refer to “output power vs temperature” section.

DRIVER PERFORMANCE CURVE



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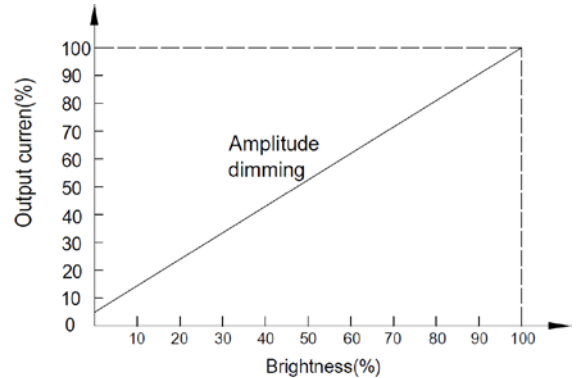
With 14-42VDC 250mA-1500mA Adjustable Output Series

DIMMING OPERATION

Dimming type

Amplitude Modulation, short as "AM", also known as Constant Current Reduction(CCR) or Analog Dimming. The AM dimming is completely invisible when camera recording but on the other hand a possible LED colour shifting could occur at low level dimming, together with a possible LED light instability due to physical differences between LEDs.

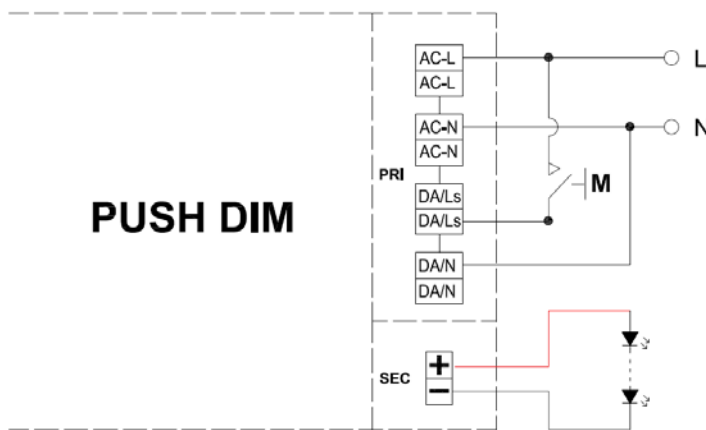
ENHANCED amplitude dimming technology is realized by adjusting the reference voltage supplied to the LED Module. It has the advantage of no surge current and high efficiency. DIM-TO-WARM LED modules are compatible with AM dimming.



PUSH Dimming

PUSH-DIM, also known as Switch-Dim or Touch-Dim. To be able to make simple light management systems, the C6 driver also integrated PUSH-DIM Function. This makes it possible to dim and switch them directly with mains AC voltage using the PUSH control terminals (PUSH-DIM interface). Only one commercial push-button is required; the controller takes over the drivers. PUSH-DIM may never be used at the same time as a DALI control system.

Circuit diagram



Wiring and cable compensation

- Do not use more than 20pcs C6 driver in a single PUSH-DIM application (up to 20 C6 Driver can be controlled by one push-button). The greater the number of C6 series driver controlled simultaneously, the greater the risk of asynchrony.
- The cable length between the push-button and the farthest C6 series driver may not be longer than 105 meters. Compensation measures must be applied for line lengths required to be more than 105 meters long (bell transformer, resistance).
- The push button can only be connected to the AC/L and PUSH terminals of the driver. It results in the short circuit if the Push Button is connected to the AC/N terminal.

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Instructions

Operation	Action duration	Action
Ultra Short Press	<0.04 sec	Won't cause any action
Briefly Press	0.04-0.5 sec	Light ON/OFF
Press and hold at ON status	0.50-5.0sec	Brightness Dimming down to 3%, or up to 100%
Press and hold at OFF status	0.50-5.0sec	Brightness Dimming From 2% up to 100%
Long Press	>15.0 sec	Reset to factory settings(up to 50%)

Note:

- a) Factory defaults 100% brightness, dimming level down to 3%.
- b) Built-in with permanent memory:
Light returns to the previous dimming level when switched off and on again, even at power failure.
- c) Synchronization of switching state and dimming direction:
For physical reasons, a PUSH-DIM system can work asynchronously; in other words, the switching state and dimming direction of the individual luminaires are different. The following steps are used to synchronize a PUSH-DIM system:
 1. Step: Press and hold (> 0,5 s) → All luminaires switch on
 2. Step: Press briefly (< 0,5 s) → All luminaires switch off
 3. Step: Press and hold (> 0,5 s) → All luminaires switch on and dim
- d) The PUSH-DIM wiring and the operator button must be rated for mains voltage (240 V).
- e) Warning: Make sure the conduct core connected to PUSH terminal is not exposed, as it connected to the live wire.

Asynchronism

As a matter of principle, asynchronisms can occur with push-button operation in systems with more than one C6 driver. The higher the number of C6 Driver and the longer the control line length, the greater the chance of asynchronisms. In order to avoid lighting installations running asynchronously in practice, the permissible number of C6 series (20) and the total line length of 25 meters must be adhered to.

DALI 2 Dimming

The DALI logo, is only allowed to use for members of the DiiA. The LEDGEAR® C6 series is DALI-compliant to any DALI master or application controller if they bear the DALI logo.

Instructions

- a) Compatible with both DALI-2 application controller or DALI-I master, please make sure they also qualified and listed in the DiiA website.
- b) Connect the DALI signal to the DA1 and DA2 terminals (polarity-free)
- c) Addressing possible:
 - Individually (max. 64 IP addresses)
 - In groups (max. 16)
 - All together
- d) The least dimming depth of DALI is of 2% * Iout.
- e) Built-in with permanent memory: light returns to the previous dimming level when switched off and on again, even at power failure.
- f) Supports star, tree, serial, parallel wiring ,but not supports ring wiring
- g) If the C6 series are not reacting to the command of the control unit. Please inspect the wiring; approx.

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16 V DC must be applied to the DALI terminal of the C6 series.

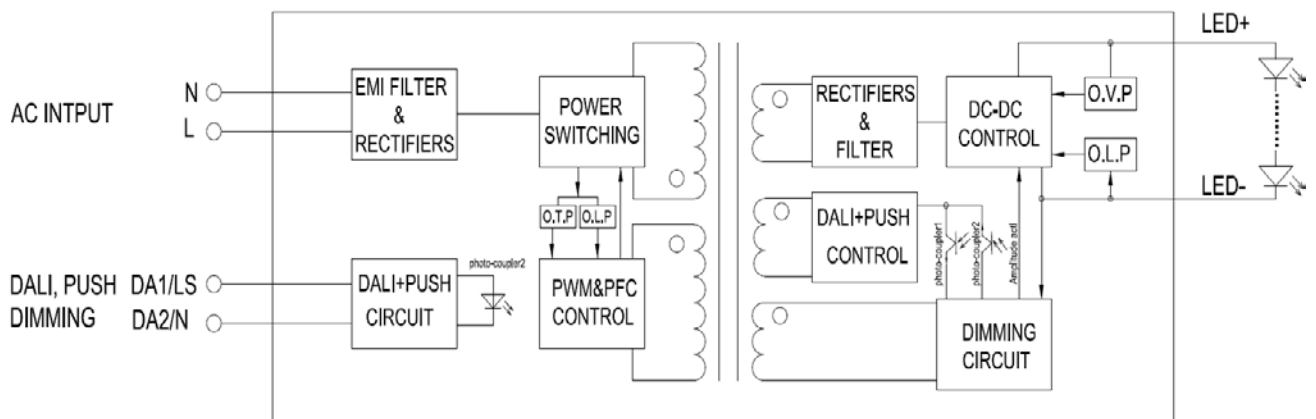
DALI INPUT	MIN	TYP	MAX
High level	9.5V	16V	22.5V
Low level	-6.5V	0	6.5V

h) DALI bus communication length and input wire diameter

Wire Diameter	DALI Bus Communication length
0.5 ² mm	100m Max.
0.75 ² mm	150m Max.
1.0 ² mm	200m Max.
≥1.5 ² mm	300m Max.

DIAGRAM&INSTALLATION MANUAL

Isolated circuit (Fly-back CV + DC-DC control)



Insulation between circuits

Electric Insulation	Input	Output	Housing	DALI	PUSH
Input	X	Reinforced	Reinforced	Basic	Non
Output	Reinforced	X	Basic	Supplementary	Supplementary
Housing	Reinforced	Basic	X	Reinforced	Reinforced
DALI	Basic	Supplementary	Reinforced	X	Basic
PUSH	Non	Supplementary	Reinforced	Basic	X

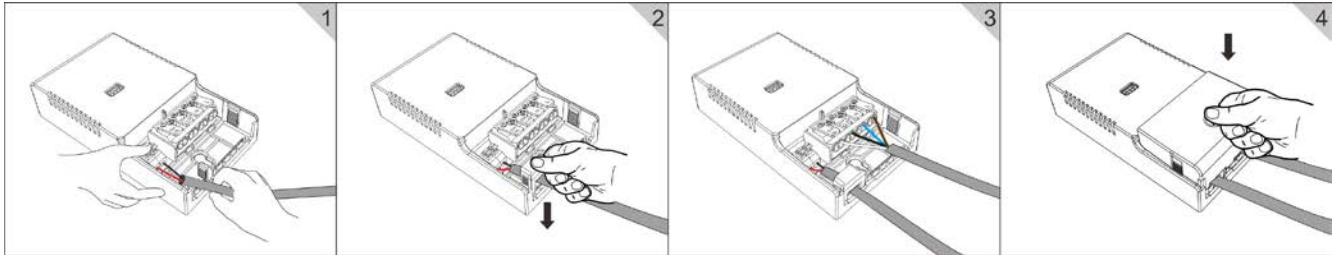
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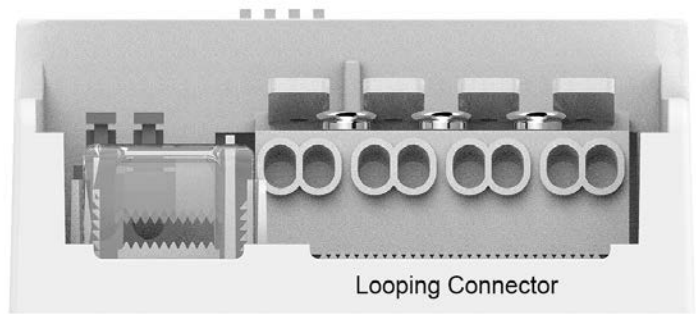
Release of the wiring

Press down the "push button" and remove the cable from front.

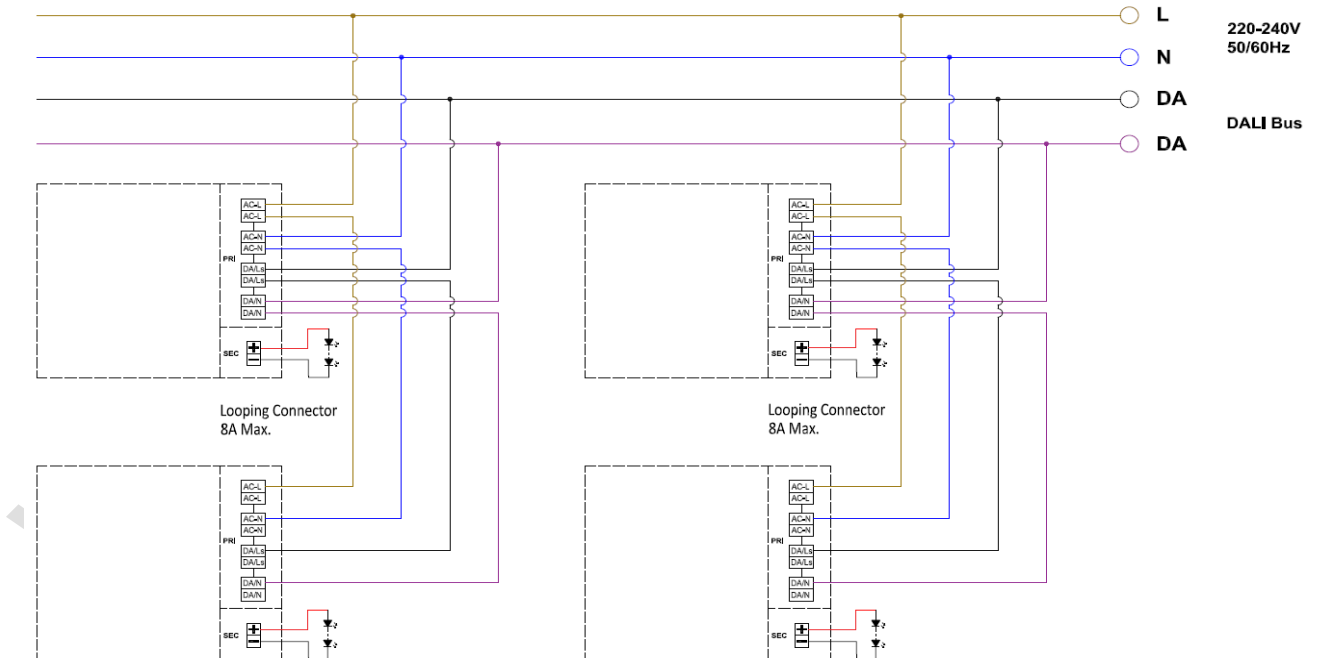


Looping Circuit diagram

These LEDGEAR® drivers provides "through wiring functions" at primary for the L,N input and DALI1,DALI2, which allows quick looping from driver to driver and save the installation labour.



Looping Connector



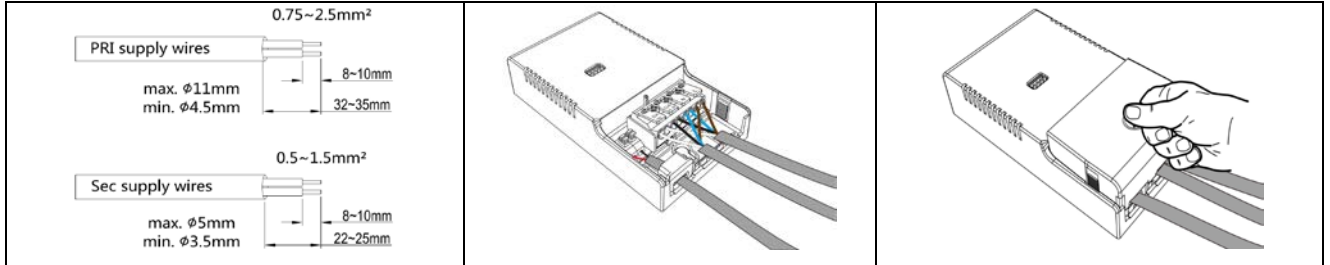
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Wiring type and cross section

The wiring can be in stranded wires with ferrules or solid with a cross section of 0.75–2.5 mm². Strip 8-10mm of insulation from the cables to ensure perfect operation of the push-wire terminals. Use one wire for each terminal connector only



Wiring guidelines

- All connections must be kept as short as possible to ensure good EMI behavior.
- Mains leads should be kept apart from LED Driver and other leads (ideally 10 – 30 cm distance).
- Incorrect wiring can damage LED modules.
- The wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc).

Miniature circuit breaker application

Total continuous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker(MCB).

Quantity of drivers(36V@1100mA Output) per miniature circuit breaker 16 A Type C

Based on inrush current I_{peak}	Typ. peak inrush current I_{peak}	1/2 value time, Δt	Calculated energy, $I_{peak}^2 \Delta t$
52pcs	30A	87uS	0.079A ² s
			<p>Example calculation of total drivers amount limited by continuous current: $n(I_{cont}) = (16 A (I_{nom, ta}) / \text{“nominal mains current with full load”}) \times 0.75$. This calculation is an example according to recommended precautions due to multiple adjacent circuit breakers (> 9 MCBs) and installation environment ($t_a=30^\circ\text{C}$); variables may vary according to the use case. Both inrush current and continuous current calculations are based on "Schneider Acti9" series circuit breakers. More specific information in "Schneider Acti9" series circuit breaker documentation.</p>

NOTE ! Type B or C MCB's are strongly recommended to use with the LED driver.

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DIP Switch Table

LEDGEAR® C6 series is a multiple-stage constant current driver, selection of output current through DIP switch is exhibited below

C628-42600DB-F							C650-421100DB-F						
Output			DIP Switch				Output			DIP Switch			
Voltage	Current	Power	1	2	3	4	Voltage	Current	Power	1	2	3	4
14-42V	250mA	10.5W	-	-	-	-	14-42V	650mA	27.3W	-	-	-	-
	300mA	12.6W	ON	-	-	-		700mA	29.4W	ON	-	-	-
	350mA	14.7W	-	ON	-	-		750mA	31.5W	-	ON	-	-
	400mA	16.8W	ON	ON	-	-		800mA	33.6W	-	-	ON	-
	450mA	18.9W	-	-	ON	-		850mA	35.7W	ON	-	ON	-
	500mA	21.0W	ON	-	ON	-		900mA	37.8W	-	ON	ON	-
	550mA	23.1W	-	ON	ON	-		950mA	39.9W	-	-	ON	ON
	600mA	25.2W	ON	ON	ON	-		1000mA	42.0W	ON	-	ON	ON
						-	14-38V	1050mA	39.9W	-	ON	ON	ON
						-		1100mA	41.8W	ON	ON	ON	ON
C665-421500DB-F													
Voltage	Current	Power	1	2	3	4							
14-42V	1150mA	48.3W	-	-	-	-							
	1200mA	50.4W	ON	-	-	-							
	1250mA	52.5W	-	ON	-	-							
14-40V	1300mA	52.0W	ON	ON	-	-							
	1350mA	54.0W	-	-	ON	-							
	1400mA	56.0W	ON	-	ON	-							
14-38V	1450mA	55.1W	-	ON	ON	-							
	1500mA	57.0W	ON	ON	ON	-							

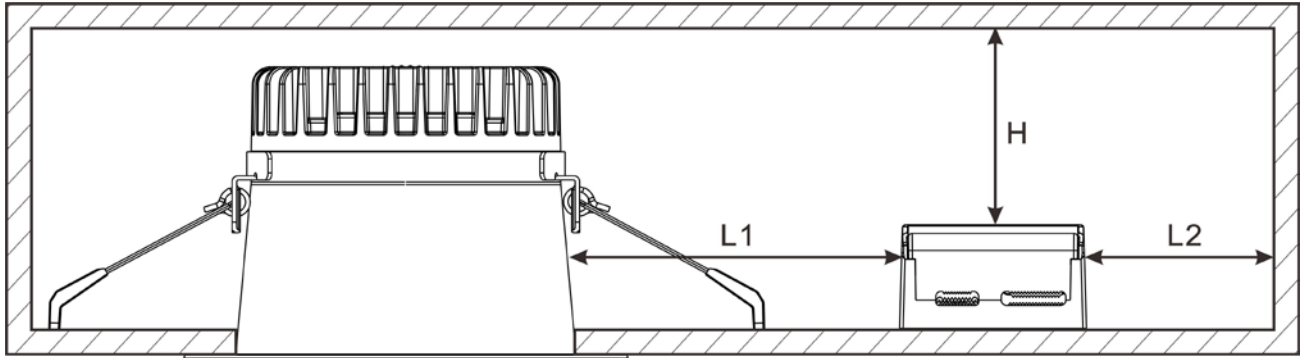
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Fixing conditions

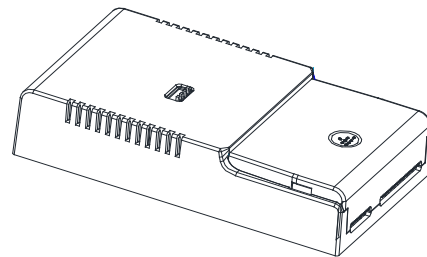
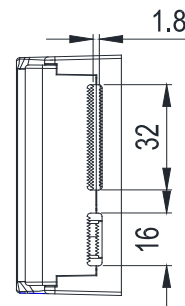
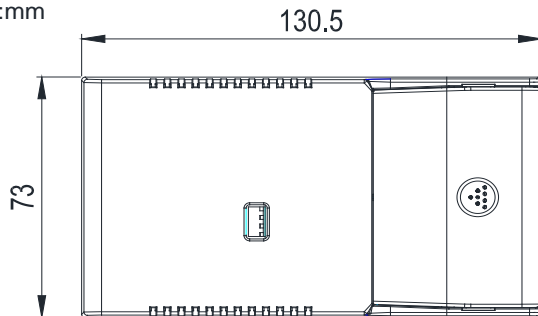
Dry, acid-free, oil-free, fat-free. It is not allowed to exceed the maximum ambient temperature (t_a) stated on the device. Minimum distances stated below are recommendations and depend on the actual luminaire. Is not suitable for fixing in corner.



Model	Size	L1(min.)	L2(min.)	H(min.)
C628-42600DB-F		100mm	10mm	15mm
C650-421100DB-F		150mm	20mm	30mm
C665-421500DB-F		200mm	20mm	30mm

MECHANICAL

Unit:mm



PACKAGING

Part Number	Dimension	Gross Weight	Net Weight	Qty/Carton
C628-42600DB-F	510x330x205mm	11.5kg	9.5kg	50pcs
C650-421100DB-F	510x330x205mm	12kg	10kg	50pcs
C665-421500DB-F	510x330x205mm	15kg	13kg	50pcs

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VERSION #

#	MODIFICATIONS	Date.
1	Version 1	2020.8.20
2	Add model : C628-42600DB-F & C665-421500DB-F	2021.08.26
3	Add Pst and SVM value	2022.04.25
4		
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12		